Technical Specification for 11 KV Class 400 Amps Double Break Group Operating Switches

1.0 **SCOPE:**

This specification covers the manufacture, testing at works and supply/erection of 11 KV Isolators of 400 Amps capacity, double break, complete with accessories such as operating pipe, connecting pipe, supporting insulators, link work, terminal connectors and locking arrangements as per IS 9921 of 1981 and to the owner's drawings.

2.0 The equipment offered shall confirm to IS 9921 of 1981 and latest amendments there off. The switches shall be suitable for horizontal upright mounting.

3.0 **CONSTRUCTION:**

3.1 The base shall be made of robust rolled M.S. Channel Section of size 75 x 40 mm. All ferrous parts shall be hot dip galvanized and all copper parts shall be tinned. The rotating shall be fitted with suitable bearings.

3.2 The blades and contacts shall be of best quality electrolytic copper and shall be capable of carrying rated current continuously without exceeding the temperature limits specified in Table 41 IS:9921 (part-II)

3.3 The insulators shall be of post type, brown glazed porcelain pedestal part type design E22 as per IS 5350 (Part-III)/1971 with cap screws and spring washers and to technical specifications enclosed conforming to IS 2544 of 1973 with amendments thereof. The insulators baked in temperature controlled kilns only shall be used. The insulator used shall be as per relevant IS and BESCOM approved.

3.4 The operating pipe shall consist of Terminal pipe (spindle rod) of length 2450mm and vertical pipe of length 5400 mm. The pipes shall 25 mm diameter class 'B' (Medium Class). The G.I pipe used shall conform to IS 1239 part-1 1979 and amendments thereof. A guide to the vertical pipe of the operating pipe shall be provided to arrest its lateral movement. Necessary fixtures for fixing the guide to the pole shall also be supplied.

3.5 The Tenderer shall clearly indicate in the tender, the Brand name of the insulators used in manufacture of 400 Amps Double Break GOS along with relevant type test reports failing which, the offer will not be considered. The successful bidder should get the insulator make approved by BESCOM, before making supplies.

3.6 185sq mm Copper tinned Heavy duty long barrel lugs suitable for terminating Rabbit / Coyote ACSR conductor shall be provided for connecting conductor to the copper flats in the GOS.

3.7 All the Iron parts shall be hot dipped Galvanized and shall conform to the relevant IS specifications with latest amendments thereof.

3.8 **ARCING HORNS:**

The switches shall be supplied with hot dip galvanized arcing horns so that while opening/closing the G.O.S and arcing takes place between arcing horns not between the contacts.

3.9 **LOCKING ARRANGEMENTS:**

Suitable locking arrangement shall be provided for arresting the operating handle.

4.0 **CHARACTERISTICS:**

a) System voltage – 11 KV
b) Rated Voltage – 12 KV
c) Rated Insulation Level:
    1. To earth and between poles 75 KV (Peak)
    2. Across Isolating Distance 85 KV
d) Rated one minute power frequency withstand test Voltage
    1. To earth and between poles 28 KV
    2. Across Isolating distance 85 KV
e) Rated normal current – 400 Amps
f) Rated duration of short circuit – 3 Secs.
g) Rated short time withstand current – 10 KA
h) Type of break – horizontal, double break.

5.0 **TYPE TEST CERTIFICATE:**

The following shall constitute type tests.

a) Impulse voltage dry test
b) Power frequency voltage dry test.
c) Power frequency voltage wet test
d) Temperature rise test
e) Measurement of Resistance
f) Test for rated peak short circuit current
g) Operation tests
h) Mechanical endurance tests.

6.0 **ROUTINE TESTS:**

The routine tests as per IS 9921 shall be conducted on each G.O.S

7.0 **NAME PLATE:**

The group operating switch shall be provided with the name plate legibly and indelibly marked with the following information:

1. Name of materials
2. Name of the manufacturer/Trade Mark
3. Name of the Purchaser that is the letters (BESCOM)
4. Purchase order No. and Date
5. Type-designation and Sl. No
6. Rated Voltage
7. Rated Current
8. IS Specification

TECHNICAL SPECIFICATION FOR 11KV PEDESTAL POST INSULATORS

1.0 **General Requirements**: The Tenderer shall clearly indicate in the tender, the Brand name of the insulators used in manufacture GOS along with relevant type test reports failing which, the offer will not be considered. The successful bidder should get the insulator make approved by BESCOM, before making supplies.

2.0 The porcelain shall be sound, free from defects, thoroughly vitrified and smoothly glazed, the glaze on insulators shall be brown in colour and should cover all exposed porcelain parts except those areas which serve as supports during fixing are required to be left unglazed as detailed in IS:2544-1963.

3.0 Precaution shall be taken during design and manufacture to avoid the following:

a) Stress due to expansion and contraction which may lead to deterioration.

b) Stress concentration due to direct engagement of the porcelain with the metal fittings.

c) Retention of water in recesses of metal fittings and shape which do not facilitate easy cleaning by normal methods.

4.0 All metal parts except those of stainless steel shall be hot dip galvanized after machining zinc coating shall satisfy the requirement of relevant IS specification. The finished galvanized surface shall be smooth.

5.0 The threads of the tapped holes on the post insulator metal fittings shall be cut after galvanizing and shall be protected against rust by greasing or other similar means. All other threads shall be cut before galvanizing.

6.0 The post insulator unit shall be assembled in a suitable jig to ensure the correct positioning of the top and bottom metal fittings relative to one another. The faces of the metal fittings shall be parallel and at right angles to the axis of the insulator and the corresponding holes in the top and bottom metal fitting shall be in vertical plane containing the axis of the insulator.

7.0 **Technical Particulars**:

Individual Units : 11kV stacking units.

1) Rating : 11kV

2) a) Unit description (as per ISS:5350/Part-III/1971) : E-22 (Except torsion strength as specified)

b) Mechanical strength as per Clause 3.2 of IS:5350/ : Strength class 'C' 7.5 to 12KN

Prt-III/1971.

3) Highest system voltage : 12 kV (rms)

4) Impulse withstand voltage : 75 KV (peak)

5) One minute Power frequency withstand Voltage Dry : 55 kV (rms)
Wet : 35 kV (rms)

6) Power Frequency Puncture withstand voltage (rms) : 1.3 times the actual dry flash cover voltage of the unit.

7) Visible Discharge test voltage : 9 KV (rms)

8) Creepage distance : 230 mm

9) Failing load (as per IS:5350 Part-III/1971)

(a) to (d) in Newtons and
(e) in Newton meters

a) Upright : 9000 N
b) Underhung : 4500 N
c) Tension : 20000 N
d) Compression : 40000 N
e) Torsion : 680 Nm

10) Height of insulator (Min) : 254mm (Tolerance ±1mm)

11) Insulating part dia (Max) : 152 mm

12) Top metal fitting pitch circle dia : 57 mm

13) Bottom metal fitting pitch circle dia: 57 mm

14) a) No. of bolts : 4 Nos.
b) Bolts holes dia : 10 mm tapped holes at the top and 12 mm plain holes at the bottom.
c) Nominal dia of mounting face not to exceed : 85 mm

8.0 **Marking**: Each insulator shall be legibly and indelibly marked with the following.

a) Name or trade mark of the manufacture
b) Month and year of manufacture
c) ISI certificate mark if any

Marking shall be durable and shall be printed by the transfer process before firing.

NOTE: Manufacturer's Test Certificate and type test certificate conducted on similar sample insulator shall be submitted for

approval before commencement of supplies.

9.0 **BOM**: Bill of Materials as per Drawing.

GUARANTEED TECHNICAL PARTICULARS FOR 11 KV 400 AMPS DOUBLE BREAK GOS

Sl. No.	Details	Results
I	Material	
1	Name of the manufacturer	
2	Type	
3	No. of poles	
4	Frequency	
5	Voltage Rating	
6	Current Rating in Amps a) Normal b) Maximum	
7	Temperature rise of the following at full rated current in O.C over ambient temperature	
8	Whether contacts are silver coated or tin coated along with thickness of coating in mm.	
9	Voltage drop across terminals of poles	
10	Short time current and duration	
11	Material of fixed contact	
12	Material of moving blade	
13	Material of terminal connector	
14	Type Diameter and length of operating handle	
15	Materials of arcing horns	
16	Size and length of base mounting channel	
17	Whether the Air break switch is complete with all accessories	
18	Whether Dimensional drawing is enclosed with the tender	
19	Minimum clearance between phase (The center distance between the insulators of adjacent phase in the assembled position of switch)	
20	Center to center distance between insulators of the consecutive poles of the same phase in the assembled position of switch (in mm)	
21	Whether mechanical interlock has been provided for arcing switches	
22	Type of bearings use in: 1. Rotating insulator stack. 2. To earth and between poles	
23	Impulse withstand voltage with 1/50 M.S wave positive and negative polarity.	
24	One minute power frequency withstand voltage across isolating distance3 to earth and between poles.	
II	**PARTICULARS OF INSULATORS**	
1	Type of insulators	
2	Name of manufacturer of insulators	
3	Height of the insulators	
4	Diameter of the largest shell	

5	Number of uni9ts per stack	
III	**ELECTRICAL CHARACTERISTICS**	
1	Flash over voltage	
2	Dry power frequency	
3	Wet power frequency	
4	Impulse voltage of 1/50 micro-sec(+ve)	
5	Impulse voltage of 1/5-micro-sec(-ve)	
6	Power frequency puncture withstand voltage of unit	
IV	Mechanical characteristics:	
	a. Cantilever strength under upright b. Cantilever strength under torsional c. Torsional strength d. Tensile Strength	
V	General Characteristics a) Minimum Creepage conforms b) Weight of complete unit	
VI	Standard to which insulator conforms	
VII	Number of Insulators per set	

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